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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of: Mello *et al.*
Serial No.: 09/490,291 Group No.: 1653
Filed: 01/20/99 Examiner: H. Schnizer
Entitled: **Novel Purification And Fiber Spinning Techniques For Protein Fibers**

TRANSMITTAL OF FORMAL DRAWINGS

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In response to the NOTICE OF INFORMAL DRAWINGS or ALLOWABILITY, attached please find:

☒ **12** sheets of formal drawing(s) for this application.

☒ Each sheet of drawing indicates the identifying indicia suggested in 37 CFR § 1.84(c) on the front side of the drawing.

Respectfully submitted:

Dated: APRIL 29, 2003

Vincent J. Ranucci

Vincent J. Ranucci, Esq.
Reg. No. 29,579

Office of Counsel
United States Army Soldiers and
Biological Chemical Command
Kansas Street
Natick, MA 01760-5035
508.233.4510

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Applicant: Mello *et al.*
Title: **Novel Purification And Fiber Spinning Techniques For Protein Fibers**
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ATGAGAGGATCGCATCACCATCACCATCACGGATCCATGGCTAGCGGTAGAGGCGGGCTGGGTGGCCAG
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GGGTTCTCAGGGGACTAGCGGTAGAGGCGGGCTGGGTGGCCAGGGTGCAGGTGCGGCTGCGGCTGCCGC
GGCAGCGGCCGCAGGCGGTGCCGGCCAAGGTGGCTATGGCGGCCTGGGTTCTCAGGGGACTAGCGGTAG
AGGCGGGCTGGGTGGCCAGGGTGCAGGTGCGGCTGCGGCTGCCGCGGCAGCGGCCGCAGG
CGGTGCCGGCCAAGGYGGCTATGGCGGCCTGGGTTCTCAGGGGACTAGCGGTAGAGGCGGGCTGGGTGG
CCAGGGTGCAGGTGCGGCTGCGGCTGCCGCGGCAGCGGCCGCAGGCGGTGCCGGCCAAGGTGGCTATGG
CGGCCTGGGTTCTCAGGGGACTAGTGGGATCCGTCGACCTGCAGCCAAGCTTAATTAG

FIG. 1

MRGSHHHHHHGSMASGRGGLGGQGAGAAAAAAAAAAAGGAGQGGYGGLGSQGTSGRGGLGGQGAGAAA
AAAAAAAGGAGQGGYGGLGSQGTSGRGGLGGQGAGAAAAAAAAAAGGAGQGGYGGLGSQGTSGRGGLG
GQGAGAAAAAAAAAAGGAGQGGYGGLGSQGTSGRGGLGGQGAGAAAAAAAAAAGGAGQGGYGGLGSQ
GTSGRGGLGGQGAGAAAAAAAAAAGGAGQGGYGGLGSQGTSGRGGLGGQGAGAAAAAAAAAAGGAGQ
GGYGGLGSQGTSGIRRPAAKLN

FIG. 2

ATGAGAGGATCGCATCACCATCACCCATCACGGATCCATGGCTAGCGGTAGAGGCGGGCTGGGTGGCCAG
GGTGCAGGTGCGGCTGCGGCTGCCGCGGCAGCGGGCCGCAGGCGGTGCCGGCCAAGGTGGCTATGGCGGC
CTGGGTTCTCAGGGGACTAGCGGTAGAGGCGGGCTGGGTGGCCAGGGTGCAGGTGCGGCTGCGGCTGCC
GCGGCAGCGGCCGCAGGCGGTGCCGGCCAAGGTGGCTATGGCGGCCTGGGTTCTCAGGGGACTAGCGGT
AGAGGCGGGCTGGGTGGCCAGGGTGCAGGTGCGGCTGCGGCTGCCGCGGCAGCGGCCGCAGGCGGTGC
CGGCCAAGGTGGCTATGGCGGCCTGGGTTCTCAGGGGACTAGCGGTAGAGGCGGGCTGGGTGGCCAGGG
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GGGTTCTCAGGGGACTAGCGGTCCGGGCGGTTATGGTCCGGGTCAACAAACTAGCGGTAGAGGCGGGCT
GGGTGGCCAGGGTGCAGGTGCGGCTGCGGCTGCCGCGGCAGCGGCCGCAGGCGGTGCCGGCCAAGGTG
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CTGCGGCTGCCGCGGCAGCGGCCGCAGGCGGTGCCGGCCAAGGTGGCTATGGCGGCCTGGGTTCTCAGG
GGACTAGCGGTAGAGGCGGGCTGGGTGGCCAGGGTGCAGGTGCGGCTGCGGCTGCCGCGGCAGCGGCC
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GGTGGCCAGGGTGCAGGTGCGGCTGCGGCTGCCGCGGCAGCGGCCGCAGGCGGTGCCGGCCAAGGTGG
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GTGCAGGTGCGGCTGCGGCTGCCGCGGCAGCGGCCGCAGGCGGTGCCGGCCAAGGTGGCTATGGCGGCC
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GAGGCGGGCTGGGTGGCCAGGGTGCAGGTGCGGCTGCGGCTGCCGCGGCAGCGGCCGCAGGCGGTGCC
GGCCAAGGTGGCTATGGCGGCCTGGGTTCTCAGGGGACTAGCGGTCCGGGCGGTTATGGTCCGGGTCAA
CAAACTAGCGGTAGAGGCGGGCTGGGTGGCCAGGGTGCAGGTGCGGCTGCGGCTGCCGCGGCAGCGGC
CGCAGGCGGTGCCGGCCAAGGTGGCTATGGCGGCCTGGGTTCTCAGGGGACTAGCGGTAGAGGCGGGCT
GGGTGGCCAGGGTGCAGGTGCGGCTGCGGCTGCCGCGGCAGCGGCCGCAGGCGGTGCCGGCCAAGGTG
GCTATGGCGGCCTGGGTTCTCAGGGGACTAGCGGTAGAGGCGGGCTGGGTGGCCAGGGTGCAGGTGCGG
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GGACTAGCGGTAGAGGCGGGCTGGGTGGCCAGGGTGCAGGTGCGGCTGCGGCTGCCGCGGCAGCGGCC
GCAGGCGGTGCCGGCCAAGGTGGCTATGGCGGCCTGGGTTCTCAGGGGACTAGCGGTCCGGGCGGTTAT
GGTCCGGGTCAACAAACTAGTGGGATCCGTCGACCTGCAGCCAAGCTTAATTAG

FIG. 3

MRGSHHHHHHGSMASGRGGLGGQGAGAAAAAAAAAAGGAGQGGYGGLGSQGTSGRGGLGGQGAGAA
AAAAAAAAGGAGQGGYGGLGSQGTSGRGGLGGQGAGAAAAAAAAAAGGAGQGGYGGLGSQGTSGRG
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GGYGPGQQTSGRGGLGGQGAGAAAAAAAAAAGGAGQGGYGGLGSQGTSGRGGLGGQGAGAAAAAAA
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AAAAAGGAGQGGYGGLGSQGTSGRGGLGGQGAGAAAAAAAAAAGGAGQGGYGGLGSQGTSGPGGYGP
GQQTSGIRRPAAKLN

FIG. 4

ATGGCTAGCATGACTGGTGGACAGCAAATGGGTCGCGGATCCATGGCTAGCGGTAGAGGCGGGCTGGGT
GGCCAGGGTGCAGGTGCGGCTGCGGCTGCCGCGGCAGCGGCCGCAGGCGGTGCCGGCCAAGGTGGCTAT
GGCGGCCTGGGTTCTCAGGGGACTAGCGGTAGAGGCGGGCTGGGTGGCCAGGGTGCAGGTGCGGCTGCG
GCTGCCGCGGCAGCGGCCGCAGGCGGTGCCGGCCAAGGTGGCTATGGCGGCCTGGGTTCTCAGGGGACT
AGCGGTAGAGGCGGGCTGGGTGGCCAGGGTGCAGGTGCGGCTGCGGCTGCCGCGGCAGCGGCCGCAGG
CGGTGCCGGCCAAGGTGGCTATGGCGGCCTGGGTTCTCAGGGGACTAGCGGTAGAGGCGGGCTGGGTGG
CCAGGGTGCAGGTGCGGCTGCGGCTGCCGCGGCAGCGGCCGCAGGCGGTGCCGGCCAAGGTGGCTATGG
CGGCCTGGGTTCTCAGGGGACTAGCGGTCCGGGCGGTTATGGTCCGGGTCAACAAACTAGCGGTAGAGG
CGGGCTGGGTGGCCAGGGTGCAGGTGCGGCTGCGGCTGCCGCGGCAGCGGCCGCAGGCGGTGCCGGCCA
AGGTGGCTATGGCGGCCTGGGTTCTCAGGGGACTAGCGGTAGAGGCGGGCTGGGTGGCCAGGGTGCAGG
TGCGGCTGCGGCTGCCGCGGCAGCGGCCGCAGGCGGTGCCGGCCAAGGTGGCTATGGCGGCCTGGGTTC
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CGGCCGCAGGCGGTGCCGGCCAAGGTGGCTATGGCGGCCTGGGTTCTCAGGGGACTAGCGGTAGAGGCG
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GGTGGCTATGGCGGCCTGGGTTCTCAGGGGACTAGCGGTCCGGGCGGTTATGGTCCGGGTCAACAAACT
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CGGCCTGGGTTCTCAGGGGACTAGCGGTAGAGGCGGGCTGGGTGGCCAGGGTGCAGGTGCGGCTGCGGC
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CGGTAGAGGCGGGCTGGGTGGCCAGGGTGCAGGTGCGGCTGCGGCTGCCGCGGCAGCGGCCGCAGGCG
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GGGCTGGGTGGCCAGGGTGCAGGTGCGGCTGCGGCTGCCGCGGCAGCGGCCGCAGGCGGTGCCGGCCA
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TCAGGGGACTAGCGGTAGAGGCGGGCTGGGTGGCCAGGGTGCAGGTGCGGCTGCGGCTGCCGCGGCAG
CGGCCGCAGGCGGTGCCGGCCAAGGTGGCTATGGCGGCCTGGGTTCTCAGGGGACTAGCGGTCCGGGCG
GTTATGGTCCGGGTCAACAAACTAGTGGGATCCGAATTCGAGCTCCGTCGACAAGCTTCGAGCACCACC
ACCACCACCACTGA

FIG. 5

MASMTGGQQMGRGSMASGRGGLGGQGAGAAAAAAAAAAGGAGQGGYGGLGSQGTSGRGGLGGQGAGA
AAAAAAAAAGGAGQGGYGGLGSQGTSGRGGLGGQGAGAAAAAAAAAAGGAGQGGYGGLGSQGTSGRG
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AGQGGYGGLGSQGTSGRGGLGGQGAGAAAAAAAAAAGGAGQGGYGGLGSQGTSGPGGYGPGQQTSGIRIR
APSTSFEHHHHHH

FIG. 6

ATGGCTAGCATGACTGGTGGACAGCAAATGGGTCGGATCCGAATTCGTGGATATGGAGGTCTTGGTGGA
CAAGGTGCCGGACAAGGAGCTGGTGCAGCCGCCGCAGCAGCAGCTGGTGGTGCCGGACAAGGAGGATA
TGGAGGTCTTGGAAGCCAAGGTGCTGGACGAGGTGGACAAGGTGCAGGCGCAGCCGCAGCCGCAGCTG
GAGGTGCTGGTCAAGGAGGATACGGAGGTCTTGGAAGCCAAGGTGCTGGACGAGGAGGATTAGGTGGA
CAAGGTGCAGGTGCAGCAGCAGCAGCTGGAGGTGTCGGACAAGGAGGACTAGGTGGACAAGGTGCTGG
ACAAGGAGCTGGAGCAGCTGCTGCAGCAGCTGGTGGTGCCGGACAAGGAGGATATGGAGGTCTCGGAA
GCCAAGGTGCAGGACGAGGTGGATCAGGTGGACAAGGGGCAGGTGCAGCAGCAGCAGCAGCTGGAGGT
GCCGGACAAGGAGGATATGGAGGTCTTGGAAGCCAAGGTGCAGGACGAGGTGGATTAGGTGGACAGGG
TGCAGGTGCAGCAGCAGCAGCAGCAGCCGGAGGTGCTGGACAAGGAGGATACGGTGGTCTTGGTGGAC
AAGGTGCCGGACAAGGTGGCTATGGAGGACTTGGAAGCCAAGGTGCTGGACGAGGAGGATTAGGTGGA
CAAGGTGCAGGTGCAGCAGCAGCAGCTGGAGGTGCCGGACAAGGAGGACTAGGTGGACAAGGAGCTGG
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GACGAGGTGGACAAGGTGCAGGCGCAGCCGCAGCAGCAGCCGGAGGTGCTGGACAAGGAGGATACGGT
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TGGACAAGGTGCAGGTGCAGCAGCAGCAGCAGCAGCAGCTGCAGGTGCCGGACAAGGAGGATTAGGTG
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GCTGGACAAGGAGCTGGAGCAGCCGCTGCAGCAGCCGCTGCAGCAGCTGGTGGTGTTAGACAAGGAGG
ATATGGAGGTCTTGGAAGCCAAGGTGCTGGACGAGGTGGACAAGGTGCAGGCGCAGCCGCAGCAGCAG
CCGGAGGTGCTGGACAAGGAGGATATGGTGGTCTTGGTGGACAAGGTGTTGGACGAGGTGGATTAGGTG
GACAAGGTGCAGGCGCAGCGGCAGCTGTTGGTGCTGGACAAGGAGGATATGGTGGTGTTGGTTCTGGGG
CGTCTGCTGCCTCTGCAGCTGCATCCCGTTTGTCTTCTCCTCAAGCTAGTTCAAGAGTTTCATCAGCTGTT
TCCAACTTGGTTGCAAGTGGTCCTACTAATTCTGCGGCCTTGTCAAGTACAATCAGTAATGTGGTTTCAC
AAATAGGCGCCAGCAATCCTGGTCTTTCTGGATGTGATGTCCTCATTCAAGCTCTTCTCGAGCACCACCA
CCACCACCACTGAA

FIG. 7

MASMTGGQQMGRIRIRGYGGLGGQGAGQGAGAAAAAAAGGAGQGGYGGLGSQGAGRGGQGAGAAAAA
AGGAGQGGYGGLGSQGAGRGGLGGQGAGAAAAAGGVGQGGLGGQGAGQGAGAAAAAAGGAGQGGYG
GLGSQGAGRGGSGGQGAGAAAAAAGGAGQGGYGGLGSQGAGRGGLGGQGAGAAAAAAAGGAGQGGYG
GLGGQGAGQGGYGGLGSQGAGRGGLGGQGAGAAAAAGGAGQGGLGGQGAGAAAAAAGGAGQGGYGGL
GSQGAGRGGQGAGAAAAAAGGAGQGGYGGQGAGQGGYGGLGSQGAGRGGLGGQGAGAAAAAAAAGGA
GQGGLGGQGAGAAAAAAGGAGQGGLGGQGAGQGAGAAAAAAAAAAGGVRQGGYGGLGSQGAGRGGQ
GAGAAAAAAGGAGQGGYGGLGGQGVGAGGLGGQGAGAAAAVGAGQGGYGGVGSGASAASAAASRLSS
PQASSRVSSAVSNLVASGPTNSAALSSTISNVVSQIGASNPGLSGCDVLIQALLGHHHHH

FIG. 8

AEIYNKDGNKVDLYGKAVGLHYFSKGNGENSYGGNGDMTYARLGFKGETQINSDLTGYGQWEY
NFQGNNSEGADAQTGNKTRLAFAGLKYADVGSFDYGRNYGVVYDALGYTDMLPEFGGDTAYSD
DFFVGRVGGVATYRNSNFFGLVDGLNFAVQYLGKNERDTARRSNGDGVGGSISYEYEGFGIVGAY
GAADRTNLQEAQPLGNGKKAEQWATGLKYDANNIYLAANYGETRNATPITNKFTNTSGFANKTQ
DVLLVAQYQFDFGLRPSIAYTKSKAKDVEGIGDVDLVNYFEVGATYYFNKNMSTYVDYIINQIDS
DNKLGVGSDDTVAVGIVYQFA

FIG. 9

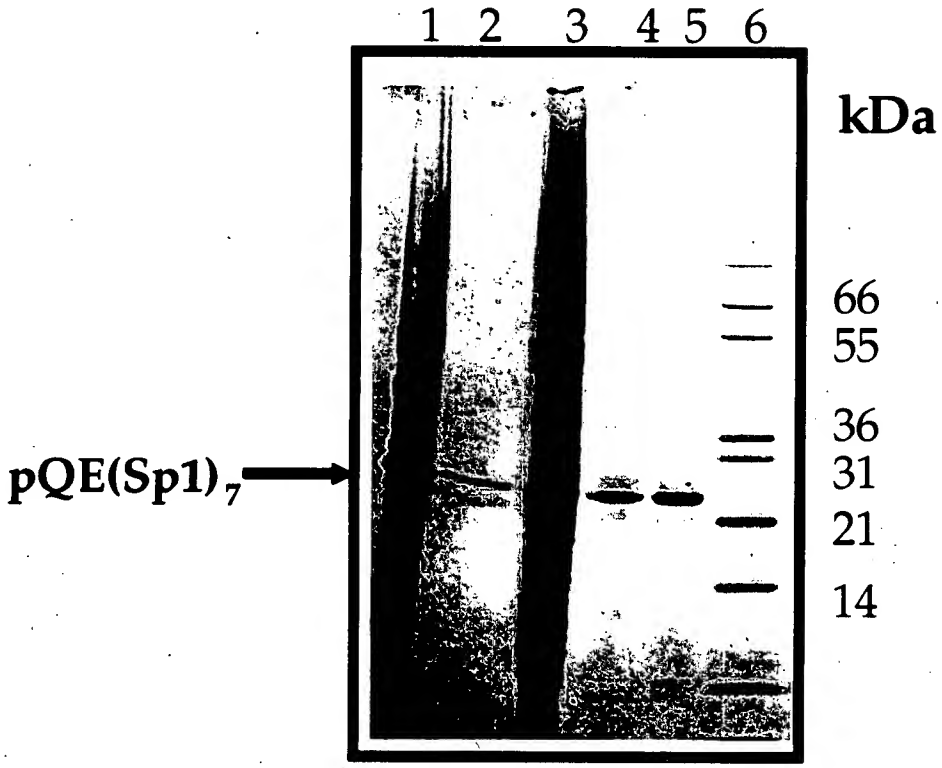
ATGAGAGGATCGCATCACCATCACCATCACGGATCCATGGCTAGCGGTGACCTGAAAAACAA
AGTGGCCCAGCTGAAAAGGAAAGTTAGATCTCTGAAAGATAAAGCGGCTGAACTGAAACAAG
AAGTCTCGAGACTGGAAAATGAAATCGAAGACCTGAAAGCCAAAATTGGTGACCTGAATAAC
ACTAGTGGGATCCGTCGACCTGCAGCCAAGCTTAATTAG

FIG. 10

MRGSHHHHHHGSMASGDLKNKVAQLKRKVRSLKDKAAELKQEVSRLENEIEDLKAKIGDLNNTSGIRRPAA
KLN

FIG. 11

Comparative Gel of Acid Lysis vs. Traditional Denaturing Conditions



1. Formic acid lysate
2. Propionic acid lysate
3. 8M urea lysate
4. 6M guanidine lysate, Ni-NTA purified
5. Formic Lysate, Ni-NTA purified
6. Molecular weight markers

FIG. 12

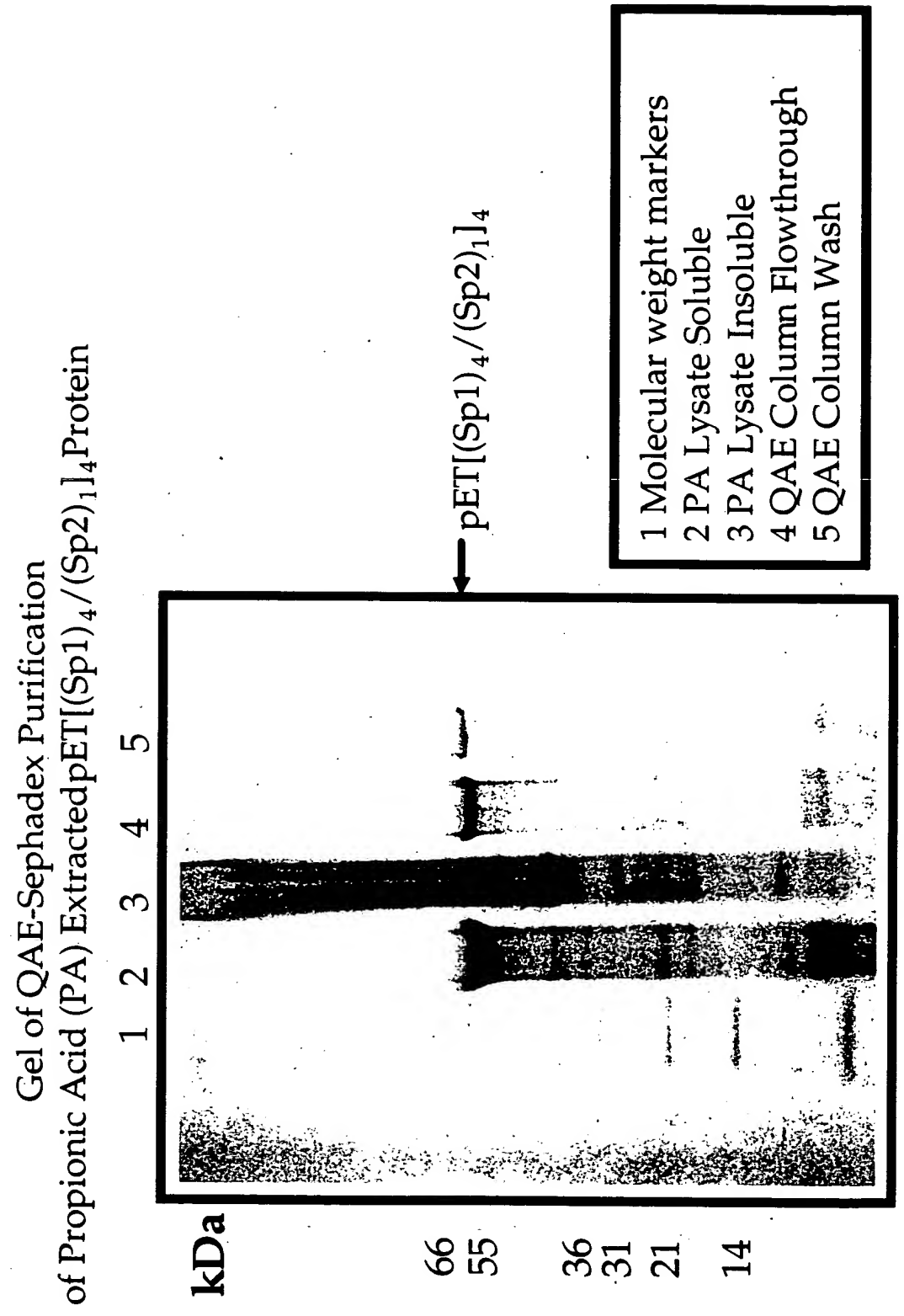


FIG. 13

QAE-Sephadex Purification of Propionic Acid
and Guanidine-HCl Extracted pET[(SP1) $_4$/(SP2)$_1$]$_4$ Protein

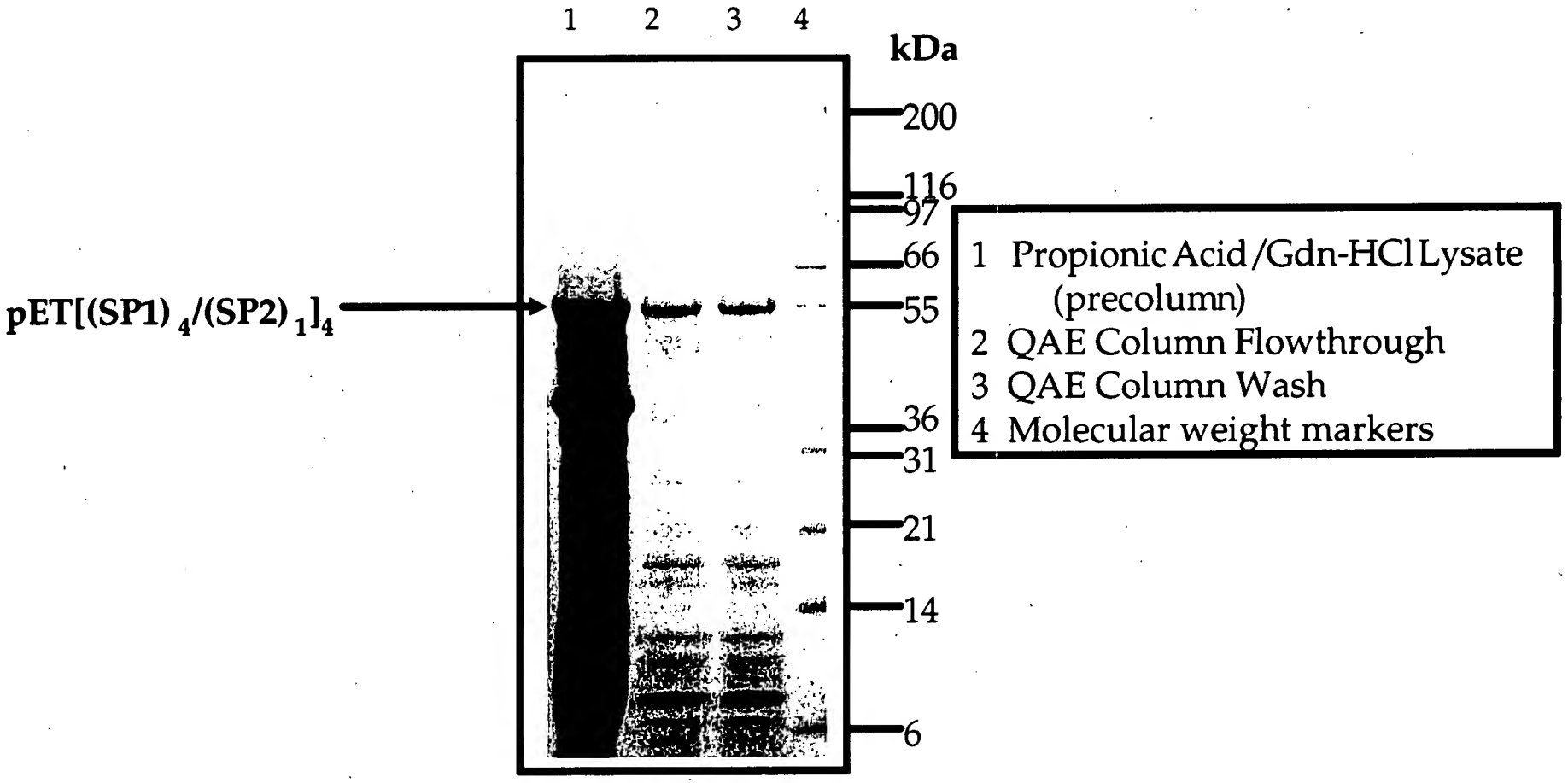


FIG. 14

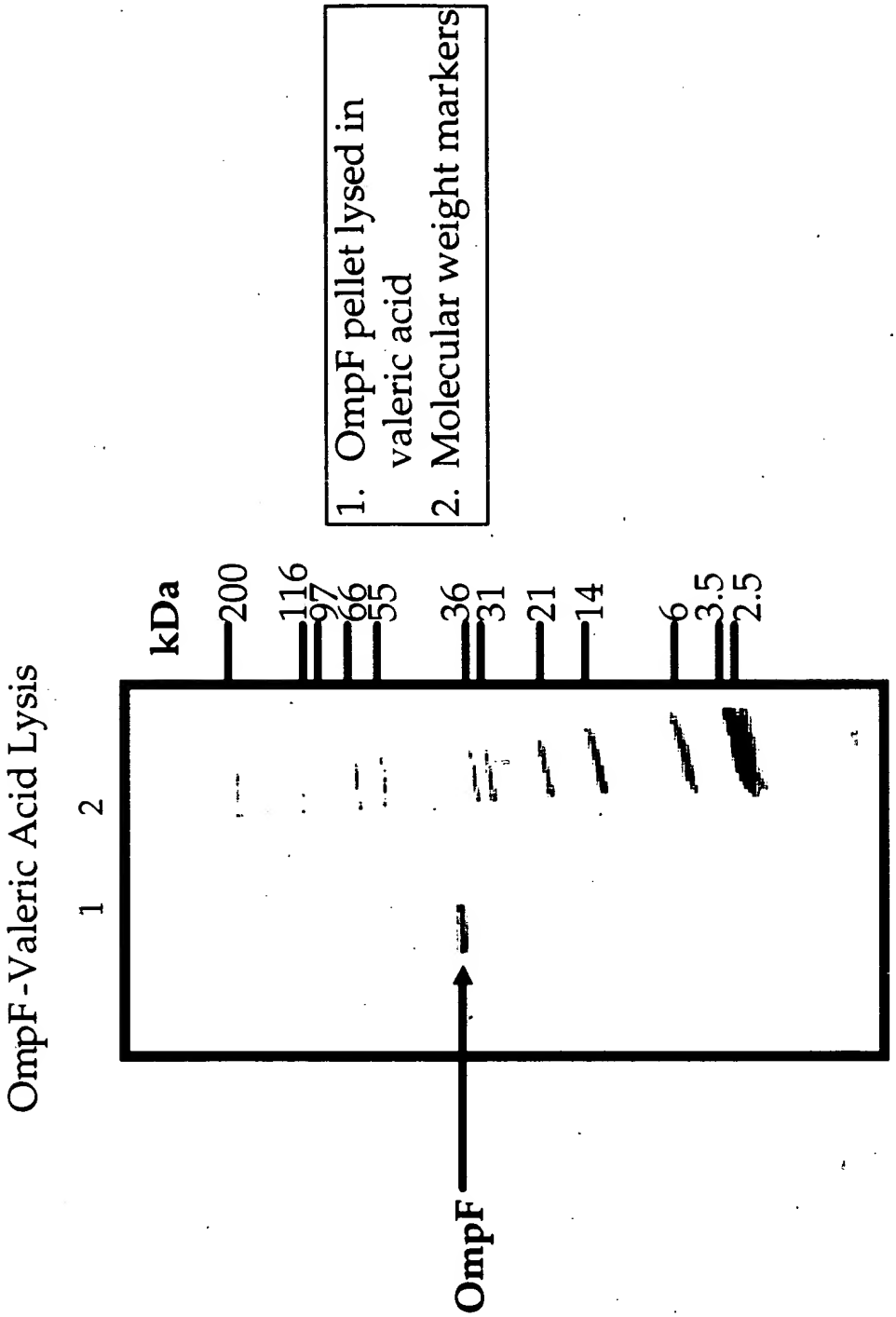


FIG. 15

Comparative Gel of Recognin B1 Acid Lysis

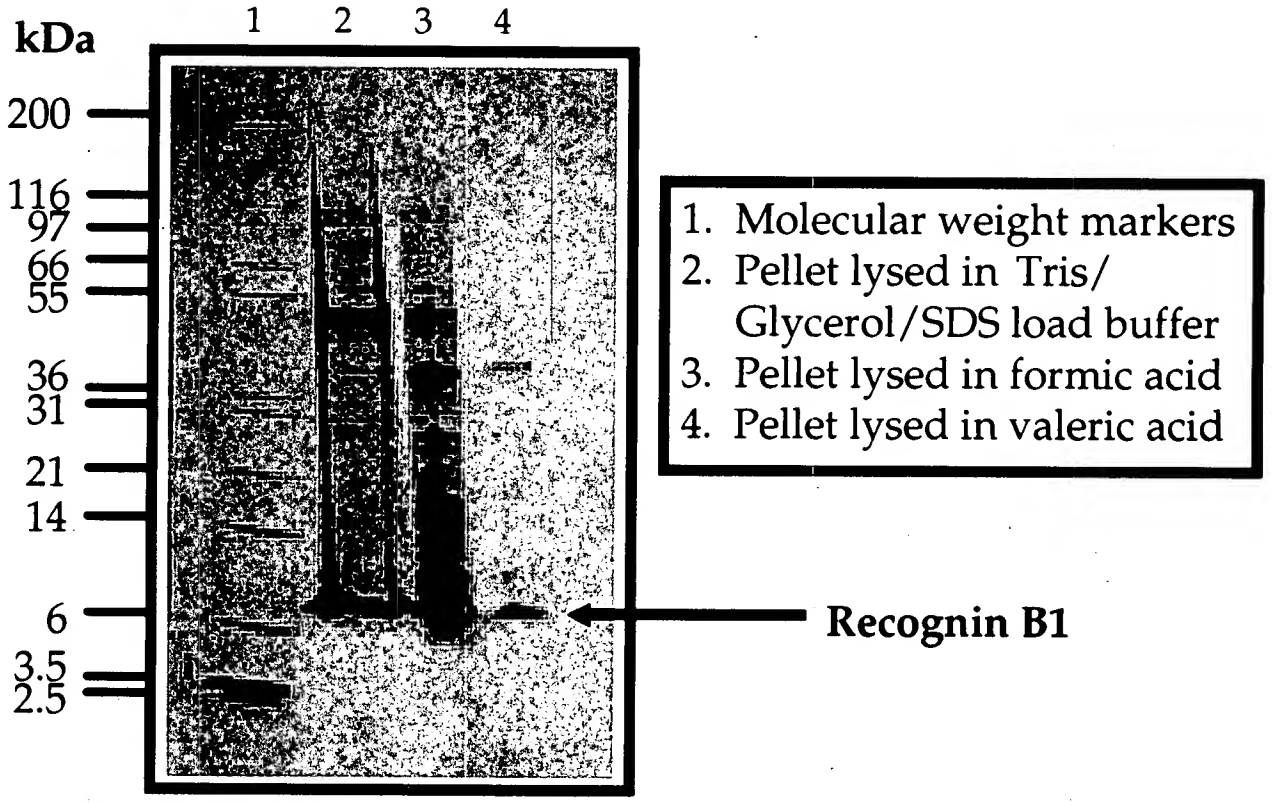
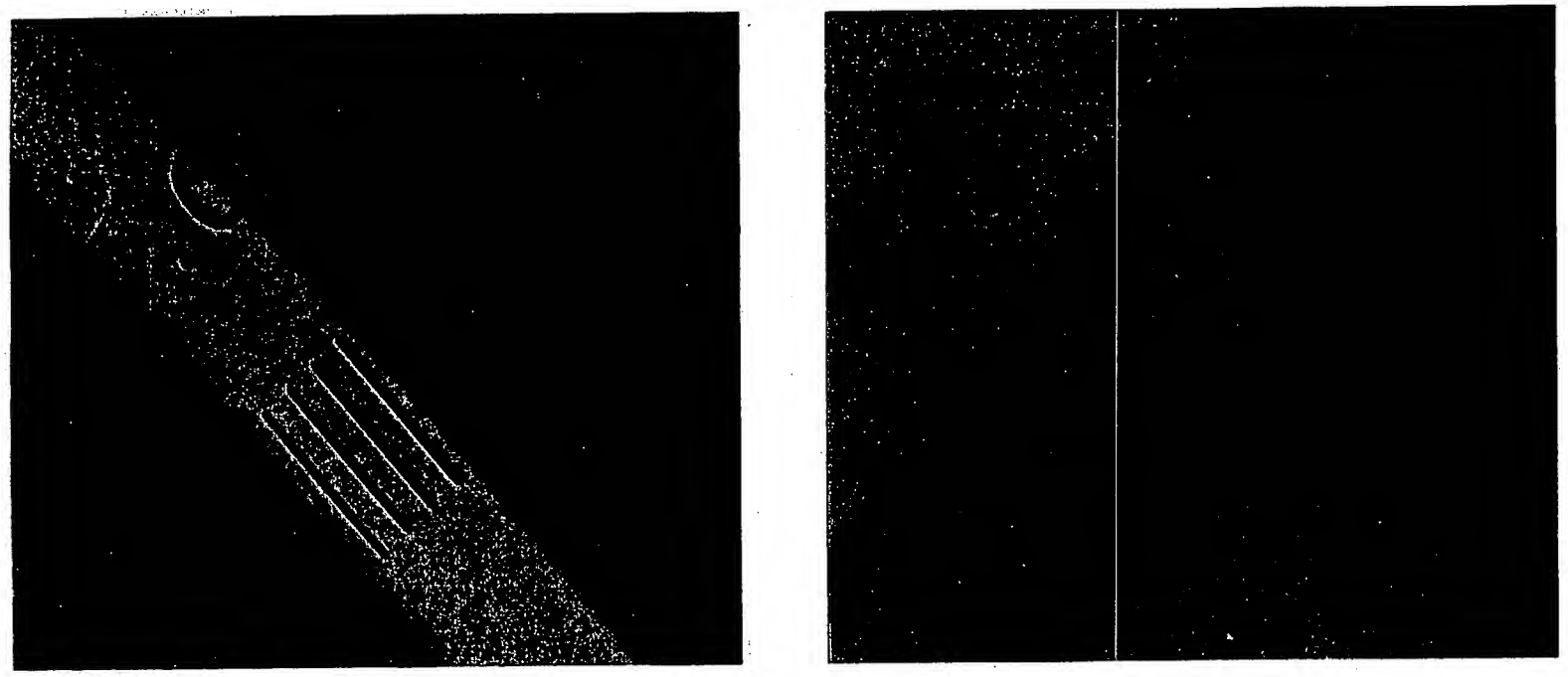


FIG. 16

pETNc DS fiber under light microscopy. Spun from 25% protein solution into 90% methanol coagulation bath.



Polarized light w/ tint plate

FIG. 17

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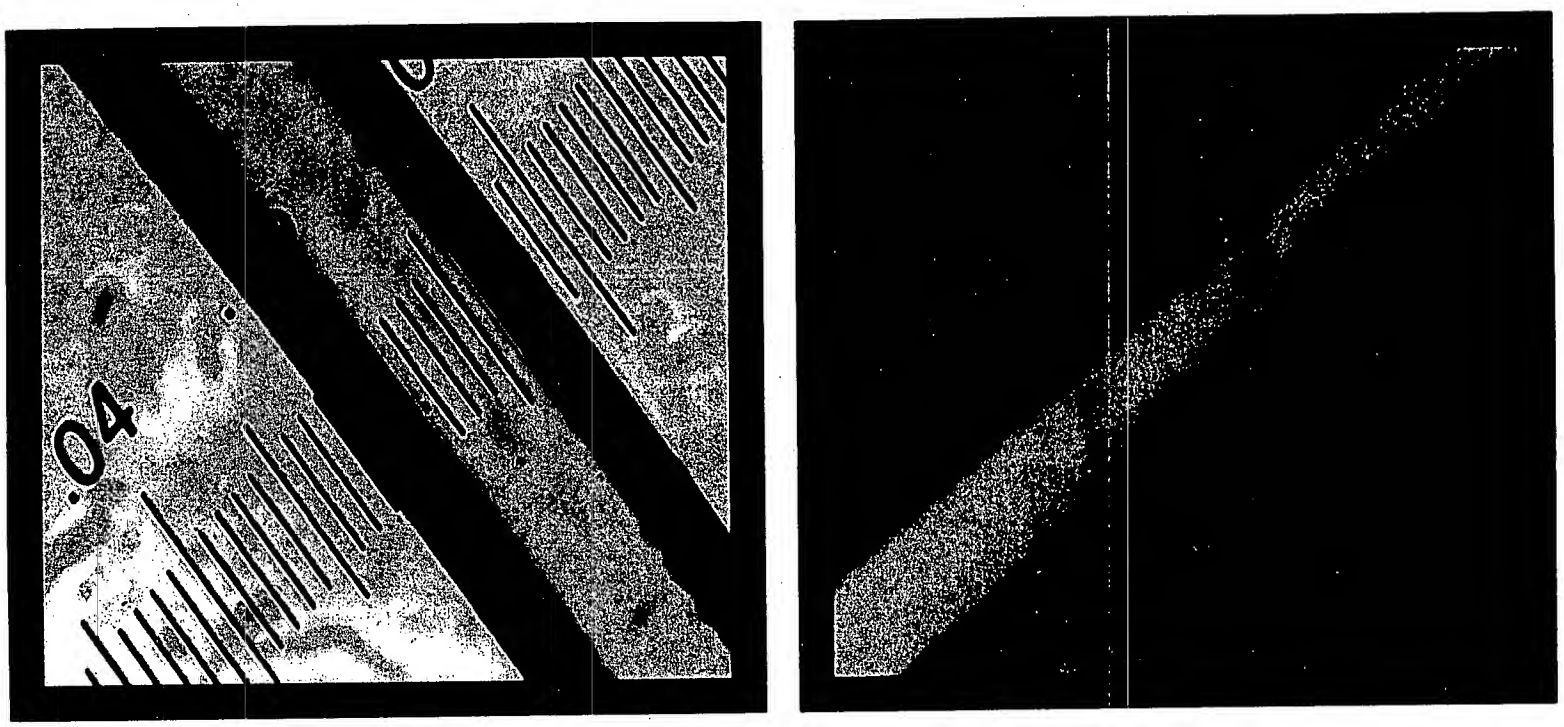
pQE[$(SP1)_4/(SP2)_1]_4$ fiber under light microscopy. Spun from a 12.5% protein solution into 90% methanol coagulation bath.



White light

Polarized light
w/ tint plate

FIG. 18

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